

a.) Amendments to the Claims

1. (Currently Amended) A powdered material spraying device, comprising:

a powdered material storage hopper for storing a powdered material, said storage hopper having a material discharge port and a material feed port, said material feed port bearing an airtight, detachable cover;

a quantitative spraying device provided for said material discharge port of said powdered material storage hopper via a material feed valve;

said quantitative spraying device ~~comprising~~, comprising (A) a cylindrical body with openings at the top and the end respectively, said cylindrical body being airtightly connected with said material discharge port of said powdered material storage hopper, (B) an elastic membrane with a penetrating aperture provided so as to form a bottom of said cylindrical body at its lower opening end, and (C) a dispersion chamber connected under said lower opening end of said cylindrical body via said elastic ~~membrane wherein~~ membrane, said dispersion chamber ~~comprises~~ comprising (i) a pulsating vibration air supply port for supplying a positive pulsating vibration air to said dispersion chamber, and (ii) a discharge port connected with a conduit for pneumatically transporting powdered material to a desired place by means of the positive pulsating vibration air, said powdered material being discharged into said dispersion chamber via said penetrating aperture when said elastic membrane is vibrated up and down by the positive pulsating vibration air supplied in said dispersion chamber from said pulsating vibration air supply port and being dispersed by the positive pulsating vibration air supplied in said dispersion chamber; and

a bypass pipe connected between said cylindrical body and said dispersion chamber through which air moves freely between said cylindrical body and said dispersion chamber during spraying operation, so as to equalize air pressure between said cylindrical body and said dispersion chamber, wherein

said pulsating vibration air supply port is provided at a lower part of said dispersion chamber in a substantially tangential direction against an internal circumference of said dispersion chamber; said discharge port being provided at an upper part of said dispersion chamber in a substantially tangential direction against the internal circumference of said dispersion chamber.

2. (Currently Amended) The A powdered material spraying device ~~as set forth in claim 1~~, comprising:

a powdered material storage hopper for storing a powdered material, said storage hopper having a material discharge port and a material feed port, said material feed port bearing an airtight, detachable cover;

a quantitative spraying device provided for said material discharge port of said powdered material storage hopper via a material feed valve;

said quantitative spraying device comprising (A) a cylindrical body with openings at the top and the end respectively, said cylindrical body being airtightly connected with said material discharge port of said powdered material storage hopper, (B) an elastic membrane with a penetrating aperture provided so as to form a bottom of said cylindrical body at its lower opening end, and (C) a dispersion chamber connected under said lower opening end of said

cylindrical body via said elastic membrane, said dispersion chamber comprising (i) a pulsating vibration air supply port for supplying a positive pulsating vibration air to said dispersion chamber, and (ii) a discharge port connected with a conduit for pneumatically transporting powdered material to a desired place by means of the positive pulsating vibration air, said powdered material being discharged into said dispersion chamber via said penetrating aperture when said elastic membrane is vibrated up and down by the positive pulsating vibration air supplied in said dispersion chamber from said pulsating vibration air supply port and being dispersed by the positive pulsating vibration air supplied in said dispersion chamber; and  
a bypass pipe connected between said cylindrical body and said dispersion chamber through which air moves freely between said cylindrical body and said dispersion chamber during spraying operation, so as to equalize air pressure between said cylindrical body and said dispersion chamber, wherein

said elastic membrane is provided by means of an elastic membrane installation device between a lower part of said cylindrical body and an upper part of said dispersion chamber,

said elastic membrane installation device comprising a pedestal with a hollow part; a push-up member with a hollow part provided so as to rise on a surface of said pedestal; and a presser member with a hollow part, said presser member being a little larger than an outer circumference of said push-up member;

said pedestal having a V-groove outside of its hollow to be outside of the outer circumference of said push-up member so as to annularly surround the hollow of said pedestal;

said presser member having an annular V-shaped projection on its surface facing said pedestal so as to be incorporated with said V-groove provided on the surface of said pedestal;

said push-up member being placed on the surface of said pedestal, said elastic membrane being placed on said push-up member and said presser member being fastened against said pedestal so as to cover both said push-up member and said elastic membrane

said elastic membrane being maintained to extend from its center to its periphery by pushing up said elastic membrane into said presser member by means of said push-up member;

a periphery of said elastic membrane extended by said push-up member being held between the periphery of said push-up member and a plane forming the hollow of said presser member, said V-groove and said V-shaped projection;

a bottom of said pedestal being provided above said dispersion chamber;  
and

a top of said presser member being provided under said cylindrical body.

3. (Previously Presented) The powdered material spraying device as set forth in claim 2, wherein said push-up member has an inclined plane extending from top to bottom at its periphery when viewed in section.

4. (Currently Amended) The powdered material spraying device as set forth in ~~any one of claims 1-3~~ either of claims 2 or 3, wherein said pulsating vibration air supply port is

provided at a lower part of said dispersion chamber in a substantially tangential direction against an internal circumference of said dispersion chamber; said discharge port being provided at an upper part of said dispersion chamber in a substantially tangential direction against the internal circumference of said dispersion chamber.

5. (Previously Presented) A powdered material spraying device, comprising:

a powdered material storage hopper for storing a powdered material,

a quantitative spraying device provided for a material discharge port of said powdered material storage hopper via a material feed valve, a cover being detachably and airtightly provided for said material feed port of said powdered material storage hopper;

said quantitative spraying device comprising, a cylindrical body with openings at the top and the end respectively, said cylindrical body being airtightly connected with said material discharge port of said powdered material storage hopper, an elastic membrane with a penetrating aperture provided so as to form a bottom of said cylindrical body at its lower opening end, and a dispersion chamber connected under said lower opening end of said cylindrical body via said elastic membrane;

said dispersion chamber comprising a pulsating vibration air supply port for supplying a positive pulsating vibration air to said dispersion chamber, and a discharge port connected with a conduit for pneumatically transporting powdered material to a desired place by means of the positive pulsating vibration air, said powdered material being discharged into said dispersion chamber via said penetrating aperture when said elastic membrane is vibrated up and down by the positive pulsating vibration air supplied in said dispersion chamber from said

pulsating vibration air supply port and being dispersed by the positive pulsating vibration air supplied in said dispersion chamber; and

a bypass pipe connected between said cylindrical body and said dispersion chamber,

wherein said elastic membrane is provided by means of an elastic membrane installation device between a lower of said cylindrical body and an upper part of said dispersion chamber,

said elastic membrane installation device comprising a pedestal with a hollow part; a push-up member with a hollow part provided so as to rise on a surface of said pedestal; and a presser member with a hollow part, said presser member being a little larger than an outer circumference of said push-up member;

said pedestal having a V-groove outside of its hollow to be outside of the outer circumference of said push-up member so as to annularly surround the hollow of said pedestal;

said presser member having an annular V-shaped projection on its surface facing said pedestal so as to be incorporated with said V-groove provided on the surface of said pedestal;

said push-up member being placed on the surface of said pedestal, said elastic membrane being placed on said push-up member and said presser member being fastened against said pedestal so as to cover both said push-up member and said elastic membrane

said elastic membrane being prevented to be extended from its center to its periphery by pushing up said elastic membrane into said presser member by means of said push-

up member;

a periphery of said elastic membrane extended by said push-up member being held between the periphery of said push-up member and a plane forming the hollow of said presser member, said V-groove and said V-shaped projection;

a bottom of said pedestal being provided above said dispersion chamber;  
and

a top of said presser member being provided under said cylindrical body.

6. (Previously Presented) The powdered material spraying device as set forth in claim 5, wherein said push-up member has an inclined plane extending from top to bottom at its periphery when viewed in section.

7. (Previously Presented) The powdered material spraying device as set forth in claim 5 or 6, wherein said pulsating vibration air supply port is provided at a lower part of said dispersion chamber in a substantially tangential direction against an internal circumference of said dispersion chamber; said discharge port being provided at an upper part of said dispersion chamber in a substantially tangential direction against the internal circumference of said dispersion chamber.

8. (Previously Presented) A powdered material spraying device, comprising:  
a powdered material storage hopper for storing a powdered material,  
a quantitative spraying device provided for a material discharge port of

said powdered material storage hopper via a material feed valve, a cover being detachably and airtightly provided for said material feed port of said powdered material storage hopper;

said quantitative spraying device comprising, a cylindrical body with openings at the top and the end respectively, said cylindrical body being airtightly connected with said material discharge port of said powdered material storage hopper, an elastic membrane with a penetrating aperture provided so as to form a bottom of said cylindrical body at its lower opening end, and a dispersion chamber connected under said lower opening end of said cylindrical body via said elastic membrane;

said dispersion chamber comprising a pulsating vibration air supply port for supplying a positive pulsating vibration air to said dispersion chamber, and a discharge port connected with a conduit for pneumatically transporting powdered material to a desired place by means of the positive pulsating vibration air, said powdered material being discharged into said dispersion chamber via said penetrating aperture when said elastic membrane is vibrated up and down by the positive pulsating vibration air supplied in said dispersion chamber from said pulsating vibration air supply port and being dispersed by the positive pulsating vibration air supplied in said dispersion chamber; and

a bypass pipe connected between said cylindrical body and said dispersion chamber,

wherein said pulsating vibration air supply port is provided at a lower part of said dispersion chamber in a substantially tangential direction against an internal circumference of said dispersion chamber; said discharge port being provided at an upper part of said dispersion chamber in a substantially tangential direction against the internal circumference of



said dispersion chamber.

9. (Previously Presented) The powdered material spraying device as set forth in claim 8 wherein said elastic membrane is provided by means of an elastic membrane installation device between a lower of said cylindrical body and an upper part of said dispersion chamber,

said elastic membrane installation device comprising a pedestal with a hollow part; a push-up member with a hollow part provided so as to rise on a surface of said pedestal; and a presser member with a hollow part, said presser member being a little larger than an outer circumference of said push-up member;

said pedestal having a V-groove outside of its hollow to be outside of the outer circumference of said push-up member so as to annularly surround the hollow of said pedestal;

said presser member having an annular V-shaped projection on its surface facing said pedestal so as to be incorporated with said V-groove provided on the surface of said pedestal;

said push-up member being placed on the surface of said pedestal, said elastic membrane being placed on said push-up member and said presser member being fastened against said pedestal so as to cover both said push-up member and said elastic membrane

said elastic membrane being prevented to be extended from its center to its periphery by pushing up said elastic membrane into said presser member by means of said push-up member;

a periphery of said elastic membrane extended by said push-up member

being held between the periphery of said push-up member and a plane forming the hollow of said presser member, said V-groove and said V-shaped projection;

a bottom of said pedestal being provided above said dispersion chamber;

and

a top of said presser member being provided under said cylindrical body.

10. (Previously Presented) The powdered material spraying device as set forth in claim 9, wherein said push-up member has an inclined plane extending from top to bottom at its periphery when viewed in section.